

## PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for July, 1891, as determined from the reports of nearly 2,000 stations, is exhibited on Chart III. In the table of miscellaneous meteorological data the total precipitation and the departure from the normal are given for regular stations of the Weather Bureau. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

The greatest monthly precipitation occurred in areas in the middle and south Atlantic and Gulf states, Florida, Arkansas, south Kansas, and east Nebraska, where it was more than 8.00, and at stations in those districts it exceeded 10.00. Over the greater part of California south of the Sacramento Valley, at stations in west-central Nevada, and along the Rio Grande River in south-central Texas no precipitation was reported. The monthly precipitation was generally less than 1.00 along the Pacific coast, over the greater part of the middle plateau region, and from the southern part of the southern plateau region over south Texas to the 95th meridian. The monthly precipitation was also less than 1.00 in central South Dakota, the northern and southern parts of lower Michigan, and at Key West, Fla.

## DEPARTURES FROM NORMAL PRECIPITATION.

The monthly precipitation was in excess of the normal in the Atlantic coast and Gulf states, except on the south New England coast, in southern North Carolina, Florida, and along the immediate east Gulf coast. It was also in excess along the eastern slope of the Rocky Mountains, over the northern and the west parts of the middle plateau region, and on the middle Pacific coast. In districts other than those named the monthly precipitation was generally deficient. The greatest excess was noted in Arkansas, where it exceeded 4.00, and the most marked deficiency occurred over the east part of the southern plateau region, where it was more than 2.00.

Considered by districts, the precipitation averaged more than double the usual amount over the plateau region; it was about one-half greater than usual over the middle plateau; one-fourth to one-half greater in the middle Atlantic and west Gulf states; and one-tenth to two-tenths greater in the south Atlantic states, the Ohio Valley and Tennessee, the extreme northwest, and on the eastern slope of the Rocky Mountains. At Key West, Fla., the monthly precipitation was about one-fifth of the usual amount; over the southern plateau region about one-fourth; on the north Pacific coast about one-half; and in New England and the upper Mississippi and Missouri valleys about four-fifths. In the east Gulf states, the Lake region, and along the middle and south Pacific coasts the monthly precipitation averaged about normal.

## YEARS OF GREATEST PRECIPITATION IN JULY.

At Atlantic City, N. J., Fort Smith and Little Rock, Ark., Fort Sill, Okla. T., Wellington, Kans., Fort Shaw, Mont., Walla Walla, Wash., and Red Bluff, Cal., the precipitation for the current month was the greatest ever reported for July. In the middle Mississippi and the middle and lower Ohio valleys the greatest precipitation noted for July occurred in 1875, when it was 5.00 to 12.00 above the normal.

## YEARS OF LEAST PRECIPITATION IN JULY.

At Key West, Fla., El Paso, Tex., and Fort Stanton and Santa Fé, N. Mex., the precipitation for the current month was the least ever reported for July. On the middle and south Pacific coasts, where no rainfall was reported for the current month, an almost entire absence of precipitation is not uncommon in July.

## PRECIPITATION JANUARY TO JULY.

For the period January to July the precipitation averaged nearly normal in New England, the Gulf States, the Missouri

and Rio Grande valleys, the Ohio Valley and Tennessee, on the southeast slope of the Rocky Mountains, over the southern and northern plateau regions, and along the Pacific coast. On the northeast and middle-eastern slopes of the Rocky Mountains the precipitation was one-fourth to one-half greater, and on the middle Atlantic coast, in the extreme northwest, and over the middle plateau region one-tenth to two-tenths greater than usual. At Key West, Fla., the precipitation was about one-half, and in the south Atlantic states, the upper Mississippi valley, and the Lake region it was about eight-tenths of the usual amount for the period named.

## DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for July for a series of years; (2) the length of record during which the observations have been taken and from which the average has been computed; (3) the total precipitation for July, 1891; (4) the departure of the current month from the average; (5) and the extremes for July during the period of observation and the years of occurrence:

State and station.	County.					(5) Extremes for July.			
		(1) Average for the month of July		(3) Total for July, 1891.	(4) Departure from average.	Greatest.		Least.	
		(1) Month of July	(2) Length of record.			Am't.	Year.	Am't.	Year.
Arkansas.									
Lead Hill .....	Boone .....	Inches	Years	Inches	Inches	Inches	Inches	Inches	Inches
California.		5.21	9	2.10	-3.11	11.60	1883	1.15	1888
Sacramento .....	Sacramento .....	0.02	41	trace.	-0.02	0.55	1860	0.00	*
Connecticut.									
Middletown .....	Middlesex .....	4.51	29	4.98	+0.47	13.43	1889	1.54	1870
Florida.									
Merritts Island .....	Brevard .....	6.28	13	3.15	-3.13	11.72	1884	0.86	1883
Georgia.									
Forsyth .....	Monroe .....	4.56	17	5.44	+0.88	12.70	1887	0.32	1878
Illinois.									
Peoria .....	Peoria .....	3.97	35	2.52	-1.15	8.87	1860	0.47	1886
Riley .....	McHenry .....	3.77	40	2.40	-1.37	9.99	1862	0.53	1890
Indiana.									
Logansport .....	Cass .....	3.19	16	1.60	-1.59	7.52	1889	0.62	1856
Vevay .....	Switzerland .....	4.13	26	2.99	-1.14	9.80	1874	0.90	1869
Iowa.									
Cresco .....	Howard .....	4.33	18	4.15	-0.18	12.70	1883	1.32	1890
Monticello .....	Jones .....	4.33	36	4.55	+0.22	10.93	1883	0.60	1874
Logan .....	Harrison .....	5.39	25	6.16	+0.80	13.00	1878	2.20	1886
Kansas.									
Lawrence .....	Douglas .....	4.34	26	6.40	+2.06	7.85	1861	0.11	1886
Wellington .....	Sumner .....	4.04	12	10.66	+6.02	10.06	1891	0.46	1890
Louisiana.									
Grand Coteau .....	St. Landry .....	5.57	8	.....	.....	12.36	1889	1.89	1888
Maine.									
Orono .....	Penobscot .....	3.46	21	3.56	+0.10	7.11	1887	1.05	1886
Maryland.									
Cumberland .....	Allegany .....	3.55	19	5.17	+1.62	5.59	1887	1.01	1885
Massachusetts.									
Ashburn .....	Hampshire .....	4.55	55	4.79	+0.23	11.58	1874	0.96	1864
Newburyport .....	Essex .....	3.89	13	3.07	-0.22	6.90	1883	1.13	1882
Somerset .....	Bristol .....	3.85	19	2.24	-1.61	7.52	1880	2.04	1886
Michigan.									
Kalamazoo .....	Kalamazoo .....	3.47	15	3.81	+0.34	6.50	1877	0.79	1887
Thornville .....	Lapeer .....	3.01	14	4.26	+1.25	6.69	1883	0.47	1881
Minnesota.									
Minneapolis .....	Hennepin .....	3.03	25	2.80	-0.23	6.26	1879	0.43	1877
Montana.									
Fort Shaw .....	Lewis & Clarke .....	1.02	21	3.40	+2.38	3.40	1891	0.00	71.74
New Hampshire.									
Hanover .....	Grafton .....	3.48	45	4.34	+0.86	8.48	1877	1.24	1854
New Jersey.									
Moorestown .....	Burlington .....	4.31	28	4.61	+0.30	7.94	1889	1.40	1882
South Orange .....	Essex .....	5.35	20	6.00	+0.65	18.58	1889	1.03	1881
New York.									
Cooperstown .....	Otsego .....	4.16	37	5.02	+0.86	7.92	1863	0.89	1868
Palermo .....	Wellsboro .....	3.28	37	4.83	+1.55	6.60	1874	0.64	1882
North Carolina.									
Lenoir .....	Caldwell .....	4.62	18	7.30	+2.68	9.10	1886	1.70	1884
Ohio.									
N. Lewisburgh .....	Champaign .....	4.71	19	4.05	-0.66	8.60	1876	0.30	1890
Wauseon .....	Fulton .....	3.68	19	2.30	-1.32	7.26	1872	0.31	1886
Oregon.									
Albany .....	Linn .....	0.54	14	0.21	-0.33	1.87	1884	0.00	*
Eola .....	Folk .....	0.40	19	0.19	-0.27	2.29	1884	0.00	*
Pennsylvania.									
Dyberry .....	Wayne .....	4.80	20	3.88	-0.92	9.28	1887	0.00	1868
Grampian Hills .....	Clearfield .....	5.02	20	7.03	+2.01	7.33	1889	3.24	1890
Wellsborough .....	Tioga .....	6.47	12	3.43	-3.04	12.30	1880	2.65	1890
South Carolina.									
Statesburgh .....	Sumter .....	4.37	10	7.25	+2.88	8.34	1890	1.70	1884
Tennessee.									
Austin .....	Wilson .....	4.02	23	4.52	+0.50	10.13	1880	0.20	1881
Texas.									
New Ulm .....	Austin .....	3.83	19	1.26	-2.57	14.38	1873	0.00	1884

*Deviations from average precipitation—Continued.*

State and station	County	(1) Average for the month of July.	(2) Length of record.	(3) Total for July, 1891.	(4) Departure from average.	(5) Extremes for July.			
						Greatest.		Least.	
						Am't.	Year	Am't.	Year
Vermont.									
Strafford.....	Orange .....	Inches 4.59	Years 18	Inches 3.85	Inches -0.74	Inches 6.77	1873 2.00	Inches 1881	
Virginia.									
Birdsneck.....	Northampton	4.24	22	7.05	+2.81	8.90	1877 1.25	1873	
Washington.									
Fort Townsend..	Jefferson .....	0.85	16	0.38	-0.47	4.41	1888 0.01	1889	
Wisconsin.									
Madison .....	Dane .....	4.32	22	2.64	-1.68	9.47	1881 0.79	1886	

\*Generally.

**EXCESSIVE PRECIPITATION.**

The following tables show, by states, the number of stations reporting monthly precipitation to equal or exceed 10.00; precipitation to equal or exceed 2.50 in 24 hours; and precipitation to equal or exceed 1.00 in 1 hour:

**Monthly precipitation to exceed 10.00.**

State.	Number of stations.	State.	Number of stations.
Louisiana.....	15	North Carolina.....	3
Mississippi.....	7	Alabama.....	1
Pennsylvania.....	5	Nebraska.....	1
Maryland.....	4	South Carolina.....	1
Arkansas.....	3	Texas.....	1
Florida.....	3	Georgia.....	1
Kansas.....	3		

**Precipitation to equal or exceed 2.50 in 24 hours.**

State.	Number of stations.	Dates.	State.	Number of stations.	Dates.
Louisiana.....	25	4-5, 5-6, 5-7, 7-8, 15, 16, 26.	Maryland.....	5	1-2, 2, 8, 18, 23-24.
Mississippi.....	15	6, 8-9, 18, 26- 27, 27-28, 29, 29-30, 30, 30-31.	New York.....	5	18, 24, 30,
Iowa.....	12	6, 6-7, 10-11, 20-21, 21, 21-22, 22,	Pennsylvania.....	4	2-3, 18, 23- 24.
Tennessee.....	10	23, 28-29, 29, 31.	Colorado.....	4	14-15, 30,
Arkansas.....	9	27, 27-28, 28- 29, 27-29, 29, 30, 31.	Georgia.....	4	25-26, 28, 29- 30.
Kansas.....	7	4, 5, 6-7, 14- 15, 22-23, 26.	North Carolina.....	3	17-18, 18-20, 19.
Ohio.....	7	7, 7-8.	Alabama.....	3	7-8, 29, 30, 31.
South Carolina.....	6	1, 18, 19-20, 20, 26, 28.	Florida.....	3	6, 12-13, 21.
Texas.....	6	4, 4-6, 5, 16, 17, 24, 25.	Nebraska.....	3	6-7, 13, 18-19.
North Dakota.....	5	11-12, 12, 20- 21.	Kentucky.....	2	7-8.

**Precipitation to equal or exceed 1.00 in 1 hour.**

State.	Number of stations.	Dates.	State.	Number of stations.	Dates.
Kansas.....	11	3, 4, 6, 14-15, 20, 22, 26, 27, 28, 31.	Texas.....	3	19, 25, 30.
Georgia.....	9	15, 17, 18, 20, 21, 23, 25, 26, 28.	Virginia.....	3	17, 20.
Iowa.....	9	6, 10, 16, 21, 22.	Wisconsin.....	3	17, 21, 28.
Florida.....	6	1, 6, 11, 12, 14 19, 21, 23.	Illinois.....	3	6-7, 13, 17,
South Dakota.....	5	3, 5, 16, 19.	Louisiana.....	3	16, 17, 26.
Arkansas.....	5	17, 25, 28, 31.	North Dakota.....	2	12, 21.
Colorado.....	5	6, 21, 24, 26, 28.	New York.....	2	15, 18.
Missouri.....	5	7, 17, 20, 22.	Alabama.....	2	6, 31.
Mississippi.....	4	3, 8, 15, 27.	Arizona.....	2	16, 26.
Nebraska.....	4	13, 19, 24, 31.	Indiana.....	2	23, 29.
Pennsylvania.....	3	3, 19, 23, 24.	Minnesota.....	2	12, 15.
South Carolina.....	3	1, 18, 19.	New Mexico.....	2	13, 22.
Tennessee.....	3	17, 22, 29.	North Carolina.....	1	20.

The following tables show the number of years for which monthly precipitation to equal or exceed 10.00 inches, daily precipitation to equal or exceed 2.50 inches, and hourly precipitation to equal or exceed 1.00 inch has been reported in the several states and territories for July during the last 22 years:

**Excessive monthly precipitation.**

State.	No. years noted.	State.	No. years noted.
Florida.....	16	Texas.....	4
North Carolina.....	12	Mississippi.....	3
Georgia.....	11	Illinois.....	3
New Hampshire.....	11	New Jersey.....	3
Alabama.....	9	Wisconsin.....	3
South Carolina.....	9	Arkansas.....	3
Iowa.....	8	Maryland.....	3
Louisiana.....	8	The Dakotas.....	2
Kansas.....	8	Minnesota.....	2
Missouri.....	7	Virginia.....	2
Ohio.....	7	West Virginia.....	2
Indiana.....	6	Colorado.....	1
Nebraska.....	6	Connecticut.....	1
Pennsylvania.....	6	Kentucky.....	1
New York.....	5	New Hampshire.....	1
Massachusetts.....	4	New Jersey.....	1
Michigan.....	4	District of Columbia.....	1
Tennessee.....	4	West Virginia.....	1
District of Columbia.....	3	Indian Territory.....	1
Indian Territory.....	3	Montana.....	1
Arkansas.....	3	Rhode Island.....	1
Arizona.....	2	Arkansas.....	1
Delaware.....	2	Arizona.....	1
Maine.....	2	Delaware.....	1
Colorado.....	2	Maine.....	1
New Mexico.....	2	New Jersey.....	1
Oregon.....	1	Indian Territory.....	1
Vermont.....	1	Missouri.....	1

**Excessive daily precipitation.**

State.	No. years noted.	State.	No. years noted.
Kansas.....	18	Tennessee.....	9
Iowa.....	17	Minnesota.....	7
Indiana.....	16	Michigan.....	6
North Carolina.....	15	Connecticut.....	6
Georgia.....	14	Kentucky.....	6
Nebraska.....	14	New Hampshire.....	6
Pennsylvania.....	14	New Jersey.....	6
Florida.....	13	District of Columbia.....	4
Texas.....	13	West Virginia.....	4
The Dakotas.....	12	Indian Territory.....	3
Illinois.....	11	Montana.....	3
Louisiana.....	11	Rhode Island.....	3
Ohio.....	11	Arkansas.....	3
Alabama.....	10	Arizona.....	2
Massachusetts.....	9	Delaware.....	2
Wisconsin.....	9	Maine.....	2
Maryland.....	9	Colorado.....	1
Pennsylvania.....	9	Mississippi.....	1
Missouri.....	9	Oregon.....	1
New York.....	9	Vermont.....	1

**Excessive hourly precipitation.**

State.	No. years noted.	State.	No. years noted.
Iowa.....	15	Minnesota.....	7
Pennsylvania.....	15	Massachusetts.....	5
Kansas.....	14	Mississippi.....	4
North Carolina.....	14	Maryland.....	4
Illinois.....	13	Wyoming.....	4
Alabama.....	12	Colorado.....	4
Florida.....	12	Kentucky.....	4
Indiana.....	12	New Mexico.....	4
Michigan.....	12	West Virginia.....	4
Nebraska.....	12	Wisconsin.....	4
The Dakotas.....	10	District of Columbia.....	4
Georgia.....	10	Maine.....	2
New York.....	10	New Jersey.....	2
Texas.....	10	Indian Territory.....	2
Virginia.....	9	Missouri.....	2
Ohio.....	8	California.....	1
Louisiana.....	8	Connecticut.....	1
South Carolina.....	8	Montana.....	1
Tennessee.....	8	New Hampshire.....	1
Arizona.....	7	Utah.....	1
Arkansas.....	7	Nevada.....	1

The following tables give exceptionally heavy monthly, daily, and hourly rainfalls reported for July during the last 22 years:

**Monthly.**

Station and state.	Am't.	Year.	Station and state.	Am't.	Year.
White, Tenn.....	Inches 28.11	Year 1883	Wilmington, N. C.....	Inches 21.12	Year 1886
Mount Washington, N. H.....	23.90	1884	Auburn, Ala.....	21.09	1887
Lake Hook, Minn.....	21.86	1872			

Daily (24 hours).

Station and state.	Amount.	Date.	Station and state.	Amount.	Date.
Union Point, Ga.	10.00	29, 1887	Cheboygan, Mich.	6.34	7-8, 1890
South Orange, N. J.	8.57	30-31, 1889	Greenville, Miss.	6.21	27-28, 1891
Fort Barrancas, Fla.	8.26	22-23, 1890	Grand Junction, Tenn.	6.10	13-14, 1890
Logan, Iowa	8.00	10, 1878	Charleston, S. C.	6.07	27-28, 1890
Plaquemine, La.	7.75	5, 1861	De Land, Fla.	6.05	12-13, 1891
Wilmington, N. C.	7.33	15, 1886	Russellville, Ark.	6.00	20, 1889
Independence, Mo.	7.61	14, 1885	Manhattan, Kans.	5.38	23, 1889
Hulmeville, Pa.	7.00	26, 1879	Rock Island Arsen'l, Ill.	5.16	13, 1889
Marengo, Ind.	7.00	23, 1890	Fort Clark, Tex.	5.00	10, 1889

One hour and less.

Station and state.	Amount.	Time.	Date.
Savannah, Ga.	Inches.	h. m.	
Jupiter, Fla.	0.47	0 05	18, 1891
Do.	0.45	0 05	21, 1890
Boston, Mass.	0.43	0 05	21, 1890
Chicago, Ill.	0.40	0 05	4, 1891
Dodge City, Kans.	0.40	0 05	14, 1890
Savannah, Ga.	0.40	0 05	6, 1891
Washington, D. C.	0.40	0 05	8, 1890
Do.	0.30	0 05	15, 1891
Huron, S. Dak.	1.30	0 10	2, 1890
Albany, N. Y.	1.22	0 10	10, 1876
Savannah, Ga.	0.92	0 10	18, 1891
Dubuque, Iowa	0.67	0 10	2, 1889
Norfolk, Va.	0.50	0 10	18, 1890
New York, N. Y.	0.50	0 10	27, 1880
Sandusky, Ohio	2.25	0 15	11, 1879
Anama, Iowa	1.56	0 15	31, 1878
New Orleans, La.	1.40	0 15	6, 1889
Philo, Ill.	1.20	0 15	8, 1888
New York, N. Y.	1.00	0 15	13, 1880
New Market, Ala.	1.08	0 15	12, 1889
Rancocas, N. J.	1.00	0 15	17, 1891
Amherst, Mass.	2.00	0 20	16, 1879
West Leavenworth, Kans.	1.90	0 20	21, 1887
Logansport, Ind.	3.50	0 30	7, 1879
Wilkes Barre, Pa.	2.50	0 30	15, 1890
Benton Harbor, Mich.	2.01	0 30	14, 1890
Jacksonville, Fla.	3.49	0 40	6, 1886
Springer, N. Mex.	3.85	0 50	13, 1891
Lansing, Mich.	3.40	1 00	21, 1883
Rock Island Arsenal, Ill.	5.10	1 15	13, 1889
Tucson, Ariz.	5.10	1 45	11, 1873

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2-50 inches, or more, in 24 hours.	Rainfall of 1 inch, or more, in one hour.	State and station.	Monthly rainfall to inches, or more.	Rainfall 2-50 inches, or more, in 24 hours.	Rainfall of 1 inch, or more, in one hour.
Florida—Continued.				Florida—Continued.			
Jacksonville				Jacksonville	Inches.	Inches.	Inches. h. m.
Jupiter				Jupiter			1.42 I 00 II
Do.				Do.			1.50 I 00 19
Orange City				Orange City	12.01	2.84	21 I 00 21
Do.				Do.			2.30 I 00 12
Saint Petersburg				Saint Petersburg			1.48 I 20 14
Do.				Do.			1.50 I 15 I
Georgia.				Georgia.			1.35 I 00 23
Americus				Americus			
Atlanta				Atlanta			1.09 0 40 20
Augusta				Augusta			1.54 0 30 15
Forsyth				Forsyth			1.00 I 00 28
Fort Gaines				Fort Gaines	10.38		1.25 0 45 21
Do.				Do.			1.88 0 45 18
Gainesville				Gainesville			2.20 0 45 25
Milledgeville				Milledgeville			
Poulan				Poulan			1.12 I 00 23
Quitman (2)				Quitman (2)			1.05 0 30 25
Savannah				Savannah			1.90 I 00 18
Do.				Do.			1.47 I 00 26
Toccoa				Toccoa			1.30 I 00 15
Do.				Do.			1.07 I 00 17
Union Point				Union Point	2.50	28	
Illinois.				Illinois.			
Chicago				Chicago			1.20 I 00 6-7
East Peoria				East Peoria	3.30	13	
Peoria (2)				Peoria (2)			1.12 0 30 13
Springfield				Springfield			1.20 0 30 17
Indiana.				Indiana.			
Angola				Angola			
Delphi				Delphi			1.00 0 30 29
Huntingburgh				Huntingburgh	3.25	7	1.06 0 35 23
Indian Territory.				Indian Territory.			
Eufaula				Eufaula			2.10 I 15 31
Iowa.				Iowa.			
Alta (1)				Alta (1)			
Bedford				Bedford	2.91	21-22	
Blakeville				Blakeville	3.84	20-21	1.17 I 00 22
Cresco				Cresco	2.77	6	
Davenport				Davenport			1.60 0 45 6
Dubuque				Dubuque			1.87 0 27 6
Eagle Grove				Eagle Grove	2.50	21	
Fayette				Fayette			1.85 0 45 22
Grundy Centre				Grundy Centre	2.80	22	
Hampton				Hampton	4.79	21-22	
Humboldt				Humboldt	2.52	21-22	
Independence				Independence	2.75	21-22	
Larrabee				Larrabee	3.91	21-22	1.16 0 33 16
McCauleyland				McCauleyland	2.52	6-7	
Marshalltown				Marshalltown			1.22 I 00 22
Monticello				Monticello	3.16	6-7	
Murray				Murray	2.90	10-11	
Muscatine (2)				Muscatine (2)			1.75 0 35 21
Sioux City				Sioux City			1.45 1.10 10
Tipton				Tipton			2.14 2.00 21
Kansas.				Kansas.			
Dodge City				Dodge City			1.00 0 46 6
Downs				Downs			1.63 0 30 4
Do.				Do.			1.18 0 20 31
Englewood				Englewood			1.25 0 45 6
Fremont				Fremont			1.02 0 45 26
Do.				Do.			1.52 0 45 28
Grinnell				Grinnell	2.50	26	
Kellogg				Kellogg	11.93		
Do.				Do.	2.50	5	1.45 0 45 20
Do.				Do.	3.00	14-15	3.00 14, 15
Larned				Larned			1.32 1.20 28
Manhattan (3)				Manhattan (3)			1.85 1.30 28
Minneapolis				Minneapolis	2.80	6-7	2.30 2.10 4
Oberlin				Oberlin			1.39 1.00 27
Stafford				Stafford	10.30	2.98	14-15
Topeka				Topeka	2.73	22-23	2.67 2.20 22
Wellington				Wellington	10.06	3-25	4 2.35 3.00 3
Kentucky.				Kentucky.			
Caddo				Caddo			3.00 7-8
Newport Barracks				Newport Barracks	2.65	7-8	
Paducah				Paducah			1.75 1.00 8
Louisiana.				Louisiana.			
Abbeville				Abbeville	10.50	5-65	5
Alexandria				Alexandria			5.44 5-7
Baton Rouge				Baton Rouge	11.44	5-19	4-5 1.04 0 45 17
Cameron				Cameron			6.00 5
Cheneyville				Cheneyville	13.11	9.92	5-7
Clinton				Clinton	14.40	10.22	5-7
Coushatta (1)				Coushatta (1)			2.55 6-7
Edgard				Edgard	13.31	4.46	6
Emilie				Emilie	10.60	3.79	6-7
Girard				Girard			4.00 6-7
Homer				Homer			2.26 2.00 16
Houma				Houma	10.58	3.30	6
Jeanerette				Jeanerette	11.91	6.78	4-5
La Fayette				La Fayette	12.03	8.75	5-7
Lake Charles				Lake Charles			2.50 6
Liberty Hill				Liberty Hill			3.00 6
Do.				Do.			4.00 16
Luling				Luling	11.25	2.85	26 2.85
Marksville				Marksville	14.77	7.50	7-8
Melville				Melville	10.38		
Minden				Minden			3.05 15
Monroe				Monroe			5.46 7
New Iberia				New Iberia	10.01	2.60	6

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.	
		Amt.	Day.	Amt.	Time.
<i>Louisiana—Continued.</i>					
Paincourtville.	Inches. 10-42	5-30	5-6	Inches. h. m.	
Plaquemine.	13-50	7-75	5		
Shell Beach.		7-00	5		
Thibodeaux.		2-53	6		
Winnsborough.		3-00	6		
<i>Maryland.</i>					
Baltimore.		2-59	8		
Barren Creek Springs.	12-33	2-65	23-24		
Jewell.	12-15	4-87	2		
Leonardtown.	10-32	3-56	1-2		
Taneytown.	10-20	2-98	1-2		
Do.		2-83	18		
<i>Michigan.</i>					
Hudson.				1.00	0 30
<i>Minnesota.</i>					
Duluth.				1.35	1 00
Moorehead.				1.75	4 00
Morris.		3-50	5-6		
<i>Mississippi.</i>					
Batesville.	10-22				
Brookhaven.		2-80	6		
Columbus (1).	13-42	2-72	18		
Do.		5-80	30-31		
Columbus (2).	14-71	4-25	30		
Corinth.		2-72	29		
Enterprise.	10-69	5-30	26-27		
Fayette.		3-52	6		
Greenville.	12-32	6-21	27-28		
Hattiesburgh.		3-12	6		
Hazlehurst.		3-03	6		
Hernando.		3-30	29-30		
Holly Springs (1).		3-51	29		
Holly Springs (2).		3-23	29		
Mayersville.				1.70	1 30
Meridian.	10-13	3-49	8-9	1.52	0 30
Natchez.		2-70	6		
Rienzi.		3-81	29	1.04	0 30
Vaiden.	10-08				3
Waynesborough (2).				1.86	0 40
<i>Missouri.</i>					
Dadeville.				1.90	1 20
Excelsior Springs.				1.55	1 30
Fayette.				1.40	0 30
Lamonte (2).		3-88	7		
Saint Charles (1).		3-50	17	3.50	2 00
Springfield.				1.00	0 50
<i>Montana.</i>					
Fort Assiniboine.		2-83	11-12		
<i>Nebraska.</i>					
Auburn (1).	10-41	4-04	6-7		
Fairbury.				1.75	0 30
Long Pine.				1.00	0 30
North Platte.				1.00	1 00
Palmer.		4-00	18-19		
Wilcox.		2-90	13	2.90	1 40
<i>Nevada.</i>					
Genoa.				1.00	1 00
<i>New Hampshire.</i>					
Belmont.		2-64	15		
North Conway.		2-65	19		
<i>New Jersey.</i>					
Oceanic.		2-61	30		
South Orange.				1.25	1 00
<i>New Mexico.</i>					
Springer.		4-60	13-14	3-85	0 50
Do.				1.08	0 45
<i>New York.</i>					
Brentwood.		3-50	18		
Hammondsport.		3-30	30		
Lowville.		2-78	24		
Minnewaska.				2.10	2 30
Staunton.		3-21	18	3.00	3 00
Watertown.		2-65	24		
<i>North Carolina.</i>					
Currituck Inlet.		6-33	19-20		
Oak Ridge.		10-99	4-20	17-18	
Raleigh.		10-99		1.79	1 25
Smithfield.			2-50	19	
Wileyton.		10-60			20
<i>North Dakota.</i>					
Davenport.		3-10	20-21		
Grand Rapids.		2-70	12	2.60	2 30
Napoleon.		3-02	11-12		
Wild Rice.		2-50	12	2.50	1 45
Do.		2-90	20-21	2.51	1 50
<i>Ohio.</i>					
Clarksville.		2-57	7-8		
Demos.		3-32	7-8		
Granville.		3-04	7-8		
Greenfield.		3-50	7		
Georgetown.		2-50	7-8		
Waverly.		3-06	7-8		
Zanesville.		3-80	7-8		
<i>Pennsylvania.</i>					
Aqueduct.		4-10	23-24		
Coatesville.	11-61				
Emporium.				2.25	1 40
Kennett Square.	10-21				23
Pottstown.		2-80	18		
Selins Grove.		2-67	23-24		
Warren.	12-54				

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.	
		Amt.	Day.	Amt.	Time.
<i>Pennsylvania—Continued.</i>					
West Chester.	Inches. 10-11			1.10	1 00
West Newton.				1.07	0 30
York.	10-77	3-56	2-3		
<i>South Carolina.</i>					
Aiken.		2.60	28		
Belmont.				1.28	0 20
Charleston.		3-81	19-20		
Florence.		2-51	28		
Hardeeville.				1.31	0 50
Do.		2.86	18	2.36	2 00
Jacksonborough.		2-51	1		
Saint Georges.	15-32	4-80	20		
Do.		2-50	26		
Statesburg.				1.87	1 17
<i>South Dakota.</i>					
Flandreau.				1.40	0 35
Forest City.		2-72	5-6	2.25	0 40
Gary.				1.30	0 30
Parkston.				1.58	1 00
Rapid City.				1.33	0 43
<i>Tennessee.</i>					
Arlington.	Inches. 3-15		28-29		
Bethel Springs.	3-08		29		
Dunlap.				1.25	0 35
Fayetteville.				4-65	29
Franklin.				3-24	28-29
Grand Junction.				2-79	29
Hohenwald.				4-89	31
Lynnville.				3-55	28-29
Memphis.				1.47	1 00
Nunnelly.				2.80	29
Savannah.				2.75	29
Sharp.				3-01	23
Trenton.					
<i>Texas.</i>					
Berlin.				1.50	0 45
Brazoria.	11-57	8-09	4-6		
Brownsville.		2-72	4		
Columbia.		3-40	5		
Do.		2-50	25		
Huntsville.		2-50	17		
Longview.		2-60	16		
Luling.				1.52	0 50
New Braunfels.		2-72	24		
Quanah.				1.75	1 30
<i>Virginia.</i>					
Lynchburg.				1.00	0 30
Norfolk.		1.25	1 00		
Stanardsville.		3-14	17-18		
Staunton.				1.53	0 25
<i>West Virginia.</i>					
Parkersburg.				1.50	0 55
Do.				1.00	1 00
Ella.		3-83	7-8		
<i>Wisconsin.</i>					
Ellsworth.				1.25	1 15
Fond du Lac.				1.21	1 00
Peshtigo.				1.00	0 12
Received too late for publication in June, 1891.					
<i>Kansas.</i>					
Emporia.		10-28			
Norton.		10-84			
MAXIMUM RAINFALL IN ONE HOUR OR LESS.					
The following table is a record of the heaviest rainfall during July, 1891, for periods of five and ten minutes and one hour, as reported by regular stations of the Weather Bureau furnished with self-registering gauges:					
Station.	5 min.	Date.	10 min.	Date.	1 hour.
	Inch.		Inch.		Inch.
Bismarck, N. Dak.	0.35	II	0.45	II	0.90
Boston, Mass.	0.40	4	0.47	4	0.54
Buffalo, N. Y.	0.10	14	0.20	26	0.40
Cincinnati, Ohio *.					
Chicago, Ill.	0.17	6	0.32	6	1.20
Cleveland, Ohio.	0.10	3	0.17	3	0.24
Denver, Colo.	0.05	6	0.10	6	0.15
Detroit, Mich.	0.14	14	0.14	14	0.33
Dodge City, Kans.	0.40	6	0.60	6	1.00
Duluth, Minn.	0.25	16	0.40	16	1.35
Eastport, Me.	0.08	4	0.12	4	0.33
Galveston, Tex.	0.26	4	0.32	17	0.50
Jupiter, Fla.	0.45	21	0.55	21	1.50
Kansas City, Mo.	0.09	11	0.15	11	0.20
Key West, Fla.	0.30	12	0.50	12	0.69
Marquette, Mich.	0.20	17	0.25	17	0.80

*Maximum rainfall in one hour or less—Continued.*

Station.	Maximum fall in—					
	5 min.	Date.	10 min.	Date.	1 hour.	Date.
Memphis, Tenn.....	Inch.		Inch.		Inch.	
New York, N. Y.....	0.35	26	0.45	25	0.45	26
New Orleans, La.....	0.18	28	0.32	28	0.45	24
Norfolk, Va.....	0.22	26	0.27	26	0.31	25
Philadelphia, Pa.....	0.27	29	0.40	17, 29	1.25	17
Philadelphia Water Works.....	0.12	29	0.18	29	0.57	29
Pittsburg, Pa.....	0.12	4	0.23	4	0.68	4
Portland, Oregon.....	0.30	30	0.37	14	0.70	14
Saint Louis, Mo.....	0.03	10	0.06	10	0.10	10
Saint Paul, Minn.....	0.09	17	0.14	7	0.45	7
San Diego, Calif.....	0.05	21	0.07	6	0.23	6
San Francisco, Calif.....						
Savannah, Ga.....	0.47	18	0.92	18	1.90	18
Washington, D. C.....	0.40	15	0.50	15	0.65	15
Wilmington, N. C.....	0.23	1, 16	0.33	1	0.77	25

\* Register not working.

† Less than 0.05 in 1 hour.

**HAIL.**

Description of the more severe hail storms of the month is given under "Local storms." Hail was reported as follows: 1st, Iowa, Missouri, New York, South Dakota. 2d, Illinois, Iowa, Kansas, Missouri, North Dakota, Ohio, Virginia, Wisconsin. 3d, Connecticut, Kansas, Maryland, Montana, Nebraska, New Jersey, New Mexico, New York, Ohio, Oregon, Pennsylvania. 4th, Colorado, Montana, Nebraska, New Mexico, New York, Pennsylvania, Utah. 5th, Colorado, South

Dakota, Washington. 6th, Colorado, Kansas, Missouri, Nebraska. 7th, Idaho, Missouri, Nebraska, Oregon, Texas, Wyoming. 8th, Wyoming. 9th, South Dakota. 10th, Iowa, Kansas, Nebraska, Wyoming. 11th, Kansas, Nebraska, North Dakota. 12th, Nebraska, North Dakota, South Dakota, Wyoming. 13th, Kansas, Michigan, Missouri, Wisconsin. 14th, Colorado, Michigan, Nebraska, New Mexico, New York, Ohio. 15th, Colorado, Maryland, Mississippi, Nebraska, New York. 16th, Arizona, Colorado, Iowa, Minnesota, Missouri, Nebraska, Oregon, Wisconsin. 17th, Colorado, Nebraska, Wisconsin, Wyoming. 18th, Colorado, Kansas, Missouri, Montana. 19th, Colorado, Montana, Nebraska, South Carolina. 20th, Michigan, Missouri, Nebraska, New York, North Dakota, Pennsylvania, South Dakota, Virginia. 21st, Colorado, Iowa, Kansas, Michigan, Minnesota, Nebraska, North Dakota, South Dakota. 22d, Colorado, Iowa, Kansas, Minnesota, Missouri, South Dakota. 23d, Colorado, Louisiana, Ohio, South Dakota. 24th, Colorado, Michigan, Missouri, Nebraska, New York, Pennsylvania, West Virginia. 25th, Colorado, Connecticut, Maine, Montana, New Hampshire, New York, North Carolina, Vermont. 26th, Colorado, Connecticut, Kansas, Nebraska, New York, South Dakota, Utah. 27th, Colorado, Maine, Nebraska, South Dakota. 28th, Iowa, Maryland, Nebraska, Nevada, New York, North Dakota, Wisconsin. 29th, Colorado, Iowa, Michigan, Nevada, Oregon, Wisconsin. 30th, Colorado, Nebraska, Pennsylvania. 31st, Colorado, Iowa. Sleet was reported in Colorado on the 27th and 29th.

**WINDS.**

The normal distribution of atmospheric pressure in July favors southerly winds east of the Rocky Mountains, variable winds over the Rocky Mountain and plateau regions, northerly winds on the north Pacific coast, and south to west winds on the middle and south Pacific coasts. For the current month southeast to southwest winds prevailed over the Atlantic and east Gulf states, Florida, the middle and southeast slopes of the Rocky Mountains, and the middle and northern plateau regions; in the Ohio Valley and Tennessee, the upper Mississippi valley, and on the middle Pacific coast they were generally from southwest to northwest; in the west Gulf states and the lower Rio Grande valley, from the southeast; in the Lake region, from south to west, except over Lake Superior, where they were from northwest to north; in the Red River of the North Valley, from the north; in the Missouri Valley, from the southwest; on the northeast slope of the Rocky Mountains, from the east; on the north Pacific coast, from west to north; on the south Pacific coast, from the west; and over the southern plateau region, variable. The most frequent direction of the wind at each station of the Weather Bureau is shown on Chart II by an arrow flying with the wind.

**HIGH WINDS.**

[In miles per hour.]

Wind velocities of 50 miles, or more, per hour were reported at stations of the Weather Bureau as follows: 2d, 50, ne., at Chicago, Ill. 4th, 56, sw., at Mount Killington, Vt. 5th, 60, se., at Galveston, Tex.; 57, nw., at Rapid City, S. Dak. 8th, 50, ne., at Chicago, Ill.; 50, sw., at Kitty Hawk, N. C. 14th, 76, nw., at Mount Washington, N. H.; 54, w., at Pueblo, Colo. 15th, 78, sw., at Green Mountain, Me. 21st, 50, n., at Yankton, S. Dak. 26th, 53, n., at Pueblo, Colo. 28th, 50, sw., at Yankton, S. Dak.

**LOCAL STORMS.**

**1st.**—Severe local storms occurred in Iowa and Missouri. At Gray, Iowa, a funnel-shaped cloud was reported; it revolved from right to left, and the path of destruction was about 3 rods in width. Seven barns, 2 dwellings, and a schoolhouse were destroyed. At Arcadia, Iowa, a thunderstorm, with heavy rain and hail, moved southward about 7 p. m., central

time, damaging buildings and crops. At Halbur, Iowa, a heavy hailstorm moved south in a path about one mile in width at 6.30 p. m. Near Glendon, Guthrie Co., Iowa, a boy was killed by lightning. At Alta, Iowa, a destructive hailstorm passed over a strip of country about 2 miles in width; a hailstorm also occurred in Sac county. A small funnel-shaped cloud was reported a few miles southwest of Aurelia, Cherokee Co., Iowa, about 5 p. m., which destroyed a barn and several small buildings. Heavy wind, rain, and hailstorms caused damage in Henry, Carroll, Howard, Livingston, and Randolph counties, Mo. At Leonardtown, Md., a heavy rainstorm damaged bridges, roads, and crops.

**2d.**—A destructive hailstorm visited Ransom and Sargent counties, N. Dak., in the afternoon. A severe wind, rain, and hailstorm occurred in Osborne county, Kans., and in Sumner county, Kans., a child was killed by lightning. A heavy hailstorm was reported in the afternoon at Galena, Ill., and at Goshen, Ind., a man was killed by lightning. A thunderstorm, with light rain and heavy hail, moved southwest over Westside, Iowa, causing damage to buildings, trees, etc. A thunderstorm from the northwest passed over Milwaukee, Wis., at 5.30 p. m., 75th meridian time; the Life Saving Station was struck by lightning and 1 man severely injured. A rain, wind, and thunderstorm occurred at Jupiter, Fla., in the afternoon; electric wires were burned out and the telegraph line was prostrated.

**3d.**—Severe thunderstorms were reported in Oswego county, N. Y., Berks county, Pa., and Saint Marys county, Md. In Berks county, Pa., 2 barns were struck by lightning and burned. In Saint Marys county, Md., 3 persons were killed and others injured by lightning. At Buffalo, N. Y., a severe gale occurred, the wind reaching a velocity of 46 miles per hour. A heavy thunderstorm, with hail, caused considerable damage near Stafford, Kans. At Walla Walla, Wash., a severe duststorm, with rain, occurred in the evening. The wind reached a velocity of 44 miles per hour from the southwest, and an extreme velocity of 50 miles per hour, causing minor damage.

**4th.**—A heavy storm of wind and rain commenced at Galveston, Tex., in the evening and continued during the 5th.